

The AGC logo consists of the letters 'AGC' in a bold, blue, sans-serif font. A small red square is positioned to the left of the letter 'C'.

**AGC**

# AFLAS<sup>®</sup> Fluoroelastomers for HEV/EV Cable Applications

The AFLAS logo features a stylized blue outline of a flame or drop shape above the word 'AFLAS' in a bold, blue, sans-serif font. Below 'AFLAS' is the word 'FLUROELASTOMERS' in a smaller, blue, sans-serif font.

**AFLAS**<sup>®</sup>  
FLUROELASTOMERS

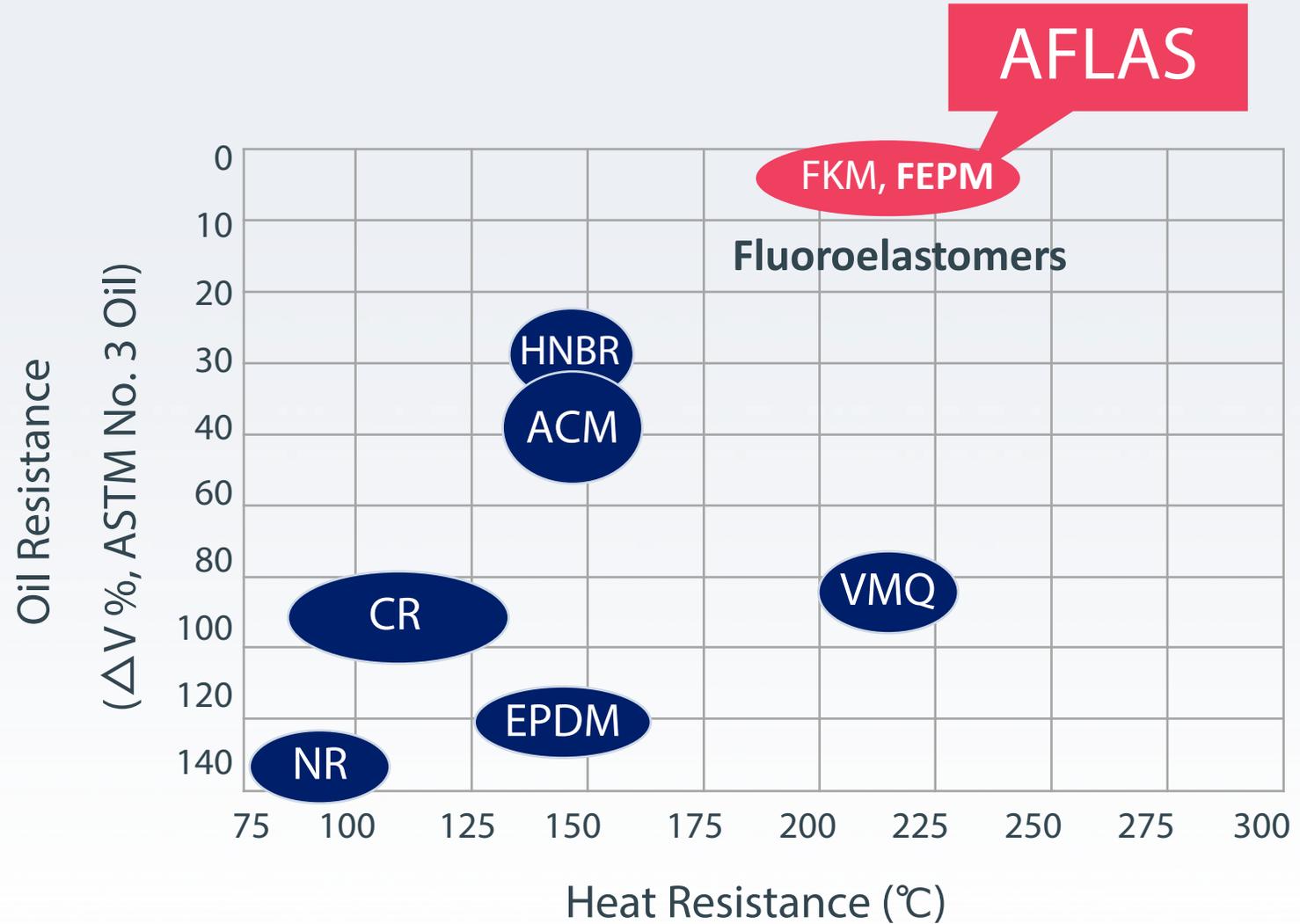
## What is AFLAS®?

- AFLAS 100 and 150 Series are unique fluoroelastomers
  - Classified by ASTM D1418 as FEPM
- Totally different from other FKM type fluoroelastomers
  - Viton
  - Daiel
  - Tecnoflon
  - Etc...
- AFLAS 100 and 150 Series are formulated as Tetrafluoroethylene/Propylene copolymer (TFE/P)
- AGC is the only manufacturer of this polymer in the world

## Benefits of AFLAS

- Excellent heat resistance
  - 200°C continuous service temperature
- Superior base resistance
- Unmatched electrical resistivity compared to FKM grades
- Used today for various cable insulator applications
  - HEV / EV power cable
  - Transmission cable
  - ATF resistant

# Positioning Map for Various Elastomers

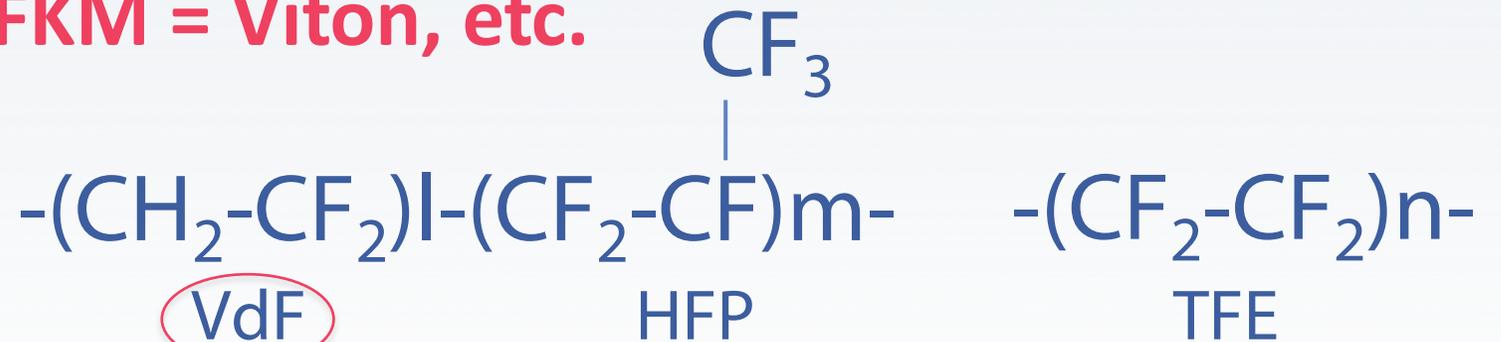


# Polymer Structure

**FEPM = AFLAS TFE-P**

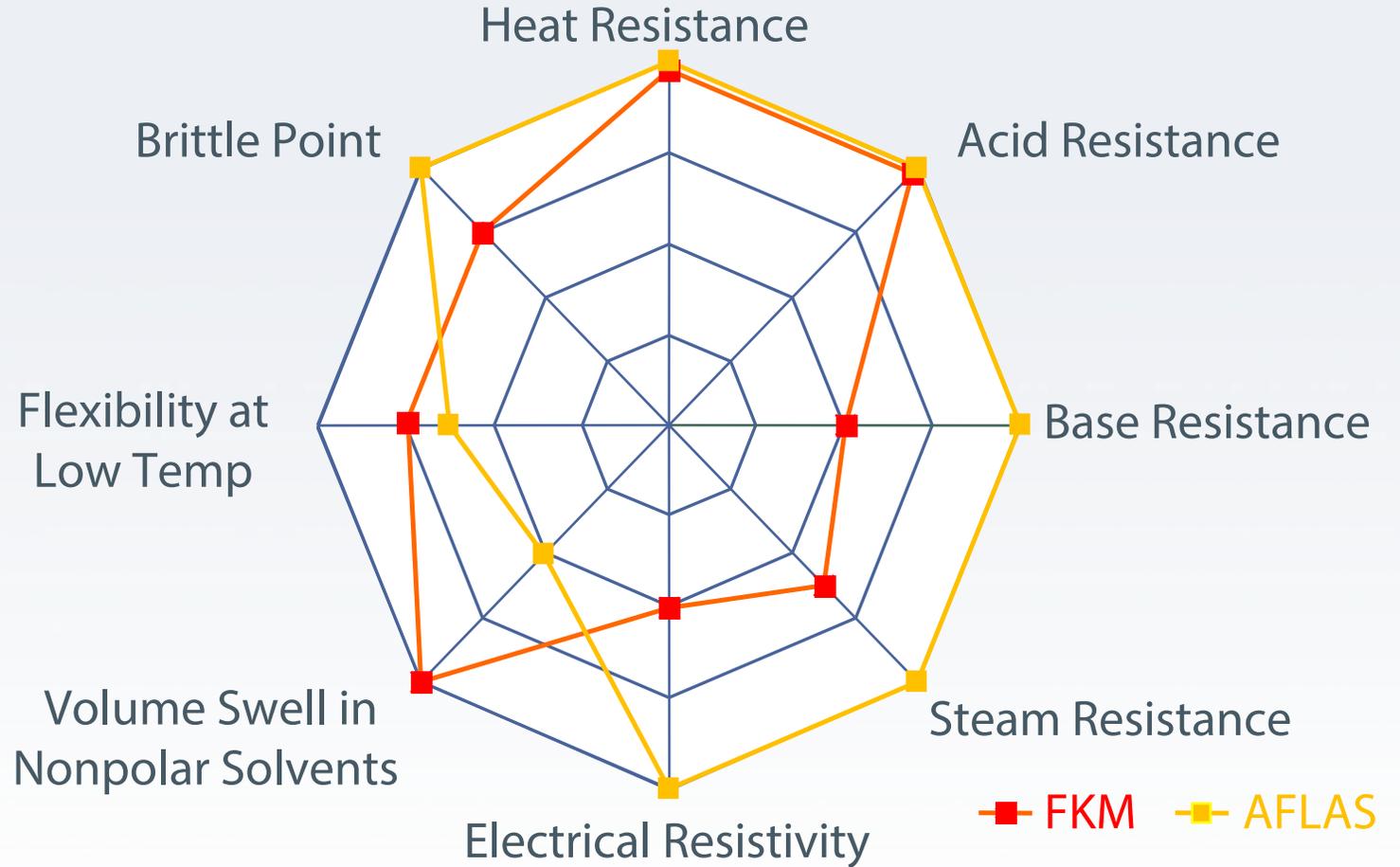


**FKM = Viton, etc.**



**Deterioration by Base**

# AFLAS Advantages Over FKM

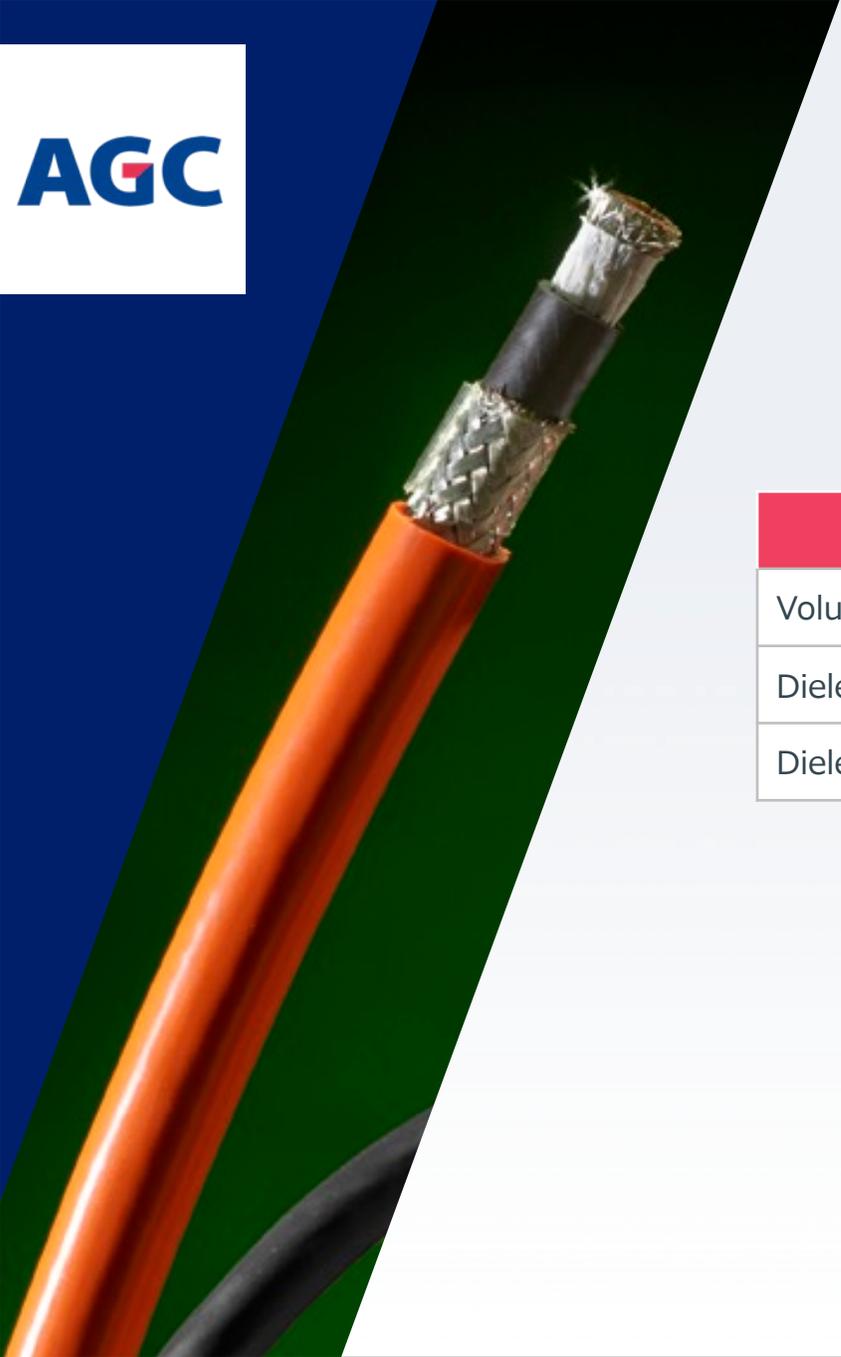


# Resistance to Automotive Fluids

Oil	Component	Application	Temperature (°C)	AFLAS®	FKM
Engine Oil		Crank Shaft Seal	160	Φ	△
AT Fluids		Transmission Seal	160	Φ	△
Gear Oil		Pinion Seal	135	Φ	X
Brake Fluids	Polyglycolether		135	○	○
Coolants	Glycol-H <sub>2</sub> O	Cylinder Liner Seal	135	○	△
Operating Oils	Glycol-H <sub>2</sub> O	Shock Absorber Seal	110	○	△
	Phosphate		-	○	○
	Silicone Oil		-	○	Φ
Fuels	Gasoline		110	X	Φ
	Light Oil		-	X	Φ
	Heavy Oil		-	Φ	△
	100% Methanol		-	Φ	△

Φ: Suitable ○: Applicable △: Caution X: Not Applicable

# Electrical Resistivity

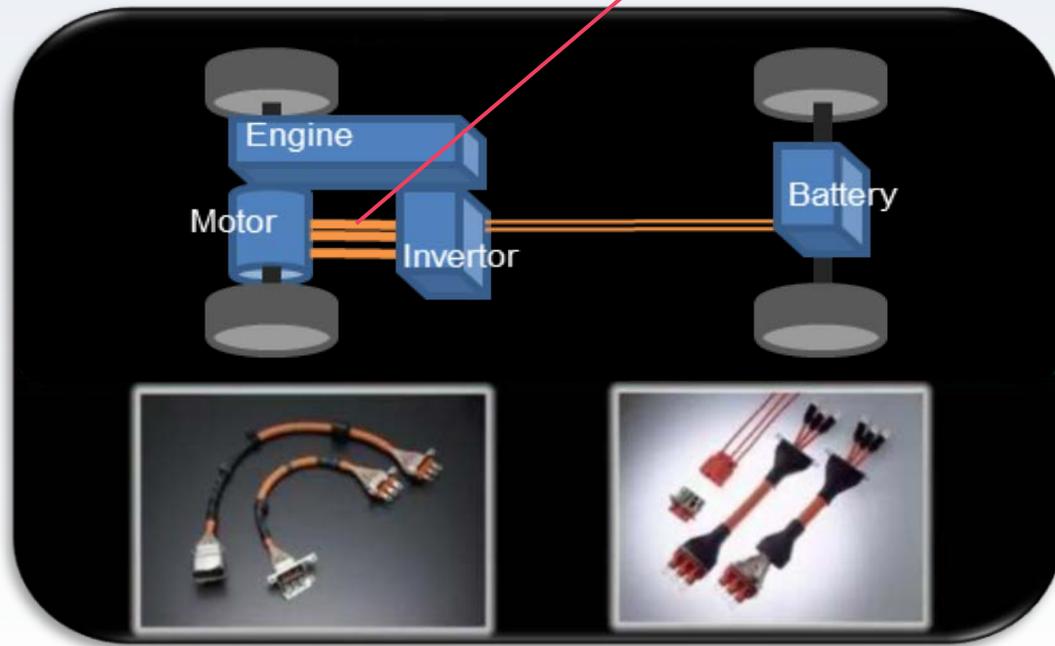
A close-up photograph of an orange cable with its outer jacket removed, showing the internal braided metal shield and copper conductors. The cable is positioned diagonally across the left side of the slide.

	AFLAS 150	AFLAS 200	FKM	EPDM	Silicone
Volume Resistivity ( $\Omega\cdot\text{cm}$ )	$10^{16}$	$10^{15}$	$10^{13}$	$10^{16}$	$10^{16}$
Dielectric constant (1 kHz)	3	6	10	2	4
Dielectric strength (kV/mm)	23	16	20	40	25

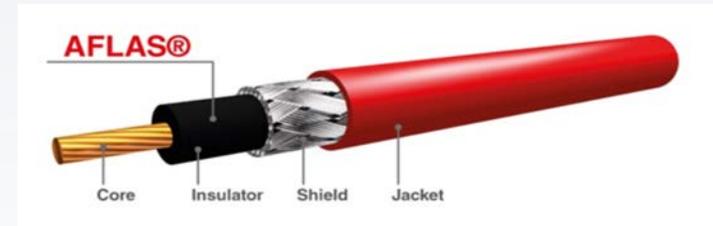
AFLAS has excellent electrical resistivity and heat resistance.

# Weight Reduction Concept for HEV/EV Cable

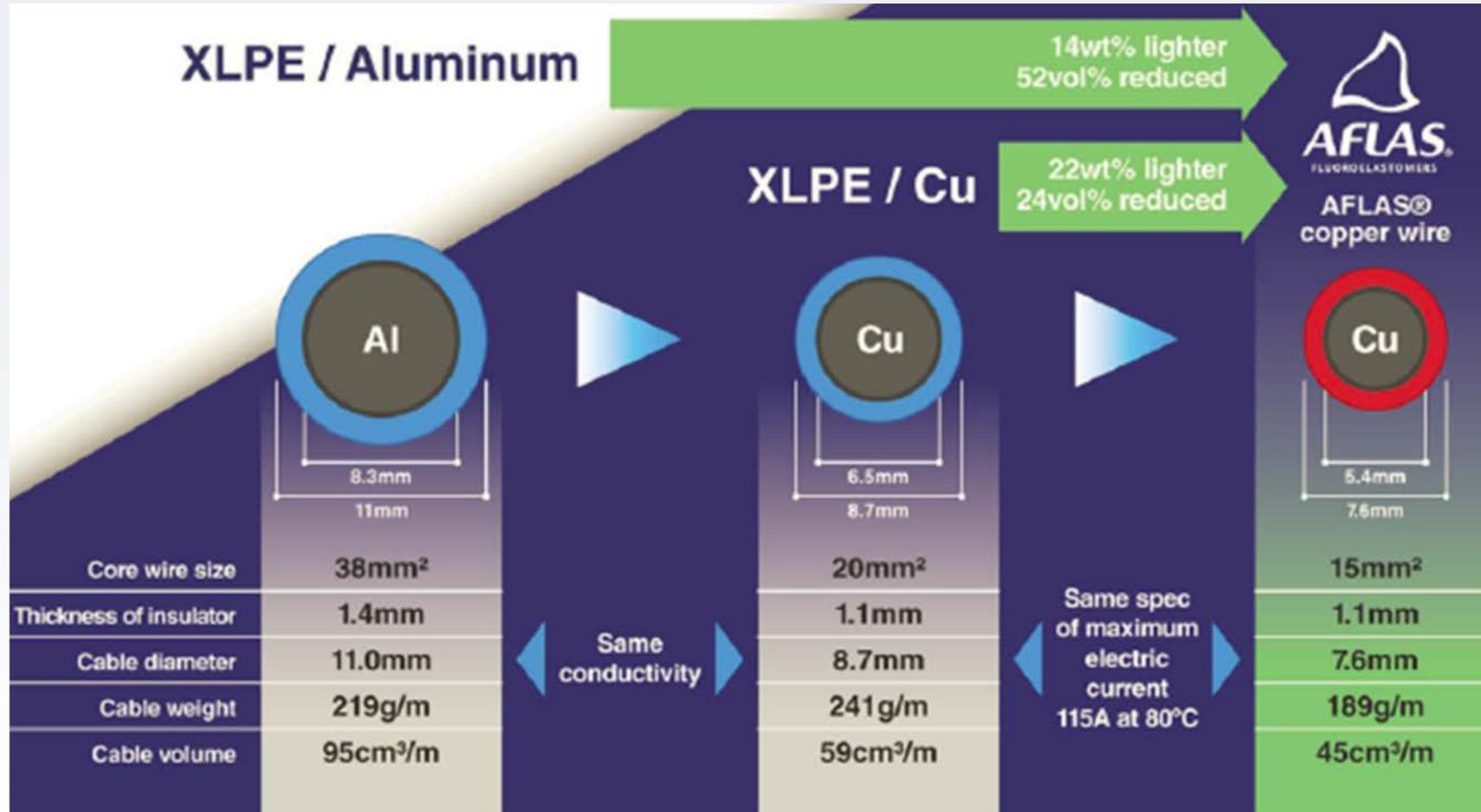
## Choice of High Voltage Cable



**XL-PE: (150°C)**  
**AFLAS: (200°C)**



# Weight Reduction Concept: Cable Comparison



# AFLAS Performance Over XL-PE Cable

## Advantages of AFLAS cable concept:

- Non-Flammable
- Weight Reduction
- Improved Flexibility
- Vibration Resistance
- Excellent Heat Resistance
- Superior Chemical resistance

## Disadvantages of XL-PE material usage:

- Filler added (lots of  $Mg(OH)_2$ )
- Stiff
- Limited Heat Resistance



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